



## City of Salem Geren Island Water Treatment Plant's Frank Mauldin Ozone Treatment Facility *(Venturi Injectors and Pipeline Flash Reactor)*

**THE PROBLEM:** Geren Island, a small island southeast of Salem, is home to the City of Salem's Geren Island Water Treatment Plant (WTP). This facility obtains their water supply from the North Santiam River. Historically during the algae season, April through October, the Geren Island WTP's slow-sand filtration system and thorough water quality monitoring of the North Santiam River, had successfully removed the cyanotoxins in their source water. But in 2018—due to several factors including an outbreak of an algal bloom in the Detroit Reservoir—the water from the North Santiam River had much higher concentrations of cylindrospermopsin and microcystin...and the appearance of these contaminants occurred much earlier than in previous years. The City of Salem took immediate action and fast-tracked a temporary treatment system which was installed within weeks. This temporary system was able to control the levels of toxins for the next few years, giving them enough time to find and build a permanent solution that would provide clean and safe drinking water long into the future.

**THE SOLUTION:** Ozone, one of the strongest commercial oxidants and disinfectants for treating water (even stronger than chlorine), was chosen by

the City of Salem as the best option to effectively treat cyanotoxins in their raw water. So in April 2020, the City broke ground at the Geren Island WTP on an intermediate ozonation facility with a flow rate range of 20-50 MGD. The water would go through the primary slow-sand filtration process which would remove cyanobacteria, a primary source of cyanotoxins. Any remaining cyanotoxins would then be destroyed in the next step...ozonation. In addition to handling cyanotoxins, ozone would:

- break down other contaminants which could cause taste and odor of the water to be off,
- improve the secondary filtration process, and
- reduce the amount of chlorine that is used in the post treatment stage.

To optimize the performance of the ozone, it would require that the ozone be forcefully mixed with the source water creating a rapid renewal of the ozone-water interface, and increasing the mass transfer rate and reaction rate. For mixing and contacting of ozone into water, Mazzei sidestream injection (SSI) provides more control, a smaller footprint, and exceptional mixing and contacting capabilities, making it an easy choice over the alternative, fine bubble diffusion.



Mazzei Venturi Injectors

**THE RESULT:** Geren Island Water Treatment Plant's state-of-the-art Frank Mauldin Ozone Treatment Facility was commissioned in April 2022. This facility, coupled with expanded filter capacity, enables the City of Salem to meet future water quantity needs and prepares them for the water quality challenges of tomorrow.

On a recent visit to the Geren Island WTP, Cody Marrs—a water treatment operator—said of the new facility,

“The system has been operational for a year now and has been performing as designed. We are quite happy with the operation and functionality of the system as a whole. There have been no issues with the injection system and only a few minor issues with rock infiltration in the heat exchangers.”



Pipeline Flash Reactor

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